CLAIMS

1. A saccadic-motion detector comprising:

an optical apparatus configured to focus light received from a subject's eye onto a focal plane; and

an optical navigation chip comprising an optical sensing surface disposed substantially in the focal plane of the optical apparatus, the optical navigation chip configured to convert analog light reflected from the eye to digital indicia of movement of the eye.

2. The detector of claim 1 further comprising a processor coupled to receive the digital indicia and configured to determine from the digital indicia a value indicative of a rate of movement of the eye.

3. The detector of claim 2 wherein the rate includes at least one of speed and acceleration.

4. The detector of claim 2 wherein the processor is configured to determine a condition associated with the subject based on the value of rate of movement of the eye.

5. The detector of claim 4 wherein the processor is configured to compare the value of rate of movement of the eye with a table associating conditions and values of rate of movement of eyes to determine the subject's condition.

6. The detector of claim 4 wherein the condition is at least one of normal, impaired, intoxicated, tired, dementia, delirium, psychosis, ADHD, depressed, and manic.

7. The detector of claim 6 wherein the condition is impaired by at least one of benzodiazepines, narcotics, narcotic pharmaceutical mixtures, ethanol, barbiturates,

and amphetamines.

8. The detector of claim 1 wherein the optical navigation chip is configured to provide the digital indicia at a frequency above about 1200Hz.

9. The detector of claim 8 wherein the optical navigation chip is configured to provide the digital indicia at a frequency between about 1200Hz and about 6000Hz.

10. The detector of claim 1 further comprising a frame coupled to the optical apparatus and the optical navigation chip and configured to be grasped by a hand.

11. The detector of claim 1 further comprising a source of light configured to provide light to the eye to be reflected by the eye and received by the optical apparatus.

12. The detector of claim 11 wherein the source of light is configured to provide near infrared light.

13. The detector of claim 1 wherein the optical navigation chip comprises an array of charge coupled devices.

14. A system for detecting saccadic motion of a subject's eye, the system comprising:

a motion transducer; and

an optical apparatus configured to focus light received from a subject's eye spanning a first aperture to a second aperture on an input of the motion transducer, the first aperture being larger than the second aperture;

wherein the motion transducer is configured to capture a state of the focused light at different times and to provide at least one indication of least one of magnitude and direction differences in captured states of the light at the different times.

15. The system of claim 14 further comprising:

a light source configured to provide light to the subject's eye; and

a housing configured to hold the light source, the motion transducer, and the optical apparatus;

wherein the housing includes a grip portion specifically configured to be grasped by a person's hand; and

wherein the system is of a size and weight that make the system readily portable.

16. A system for detecting saccadic motion of a subject's eye, the system comprising:

a motion transducer configured to receive light at a first instance in time and a second instance in time indicative of a first position of the subject's eye and a second position of the subject's eye respectively and to provide at least one discrete indication of at least one of a magnitude and a direction difference between the first and second positions;

a processor coupled to the motion transducer and configured to process the at least one indication to determine a rate of movement of the subject's eye.

17. The system of claim 16 wherein the motion transducer is configured to provide the indication at a frequency of at least about 1200Hz.

18. The system of claim 16 wherein the motion transducer is configured to provide indicia of magnitude and direction differences in two dimensions.

19. The system of claim 16 wherein the at least one indication is one of a positive integer, a negative integer, and zero.

20. A method of processing saccadic eye movement information, the method

comprising:

capturing a first state of light reflected from a subject's eye at a first time;

capturing a second state of light reflected from a subject's eye at a second time;

determining at least one of a magnitude difference and a direction difference between the first and second states;

providing at least one indication of the at least one of a magnitude difference and a direction difference; and

processing the at least one indication to determine a rate of movement of the subject's eye.

21. The method of claim 20 further comprising providing an objective indication of a condition of the subject, the indicated condition being associated with a known rate that is similar to the determined rate.

22. The method of claim 21 further comprising comparing the determined rate with known rates and associated conditions.

23. The method of claim 20 wherein the first and second times are no more than about $1/1200^{th}$ of a second apart.

24. The method of claim 20 wherein the determining of the at least one of a magnitude difference and a direction difference comprises collapsing values of a two-dimensional array of values into at least one single dimension, and crosscorrelating multiple sets of collapsed data.

25. The method of claim 24 wherein the crosscorrelating comprises determining a direction and number of elements to shift a first set of collapsed values to best match with a second set of collapsed values.